

Name

Key

Solving Systems of Equations Review

Solve using substitution or elimination.

$$\begin{array}{r} 1. \quad x + 4y = 9 \\ \quad (x - y = 4) \\ \quad -x + y = -4 \\ \hline \end{array}$$

$$5y = 5$$

$$y = 1$$

$$x = 5$$

$$(5, 1)$$

$$\begin{array}{r} 3. \quad (8x - 7y = -3) \cdot 5 \\ \quad (6x - 5y = -1) \cdot 7 \\ \hline \end{array}$$

$$\begin{array}{r} 40x - 35y = -15 \\ -42x + 35y = 7 \\ \hline \end{array}$$

$$-2x = -8$$

$$x = 4$$

$$(4, 5)$$

$$\begin{array}{r} 24 - 5y = -1 \\ -5y = -25 \\ y = +5 \end{array}$$

$$\begin{array}{r} 5 \left(\frac{m}{3} + \frac{n}{3} = 2 \right) \cdot 9 \\ 2m + 3n = 10 \\ \hline \end{array}$$

$$-3m - 3n = -18$$

$$-m = -8$$

$$m = 8$$

$$(8, -2)$$

$$16 + 3n = 10$$

$$3n = -6$$

$$n = -2$$

$$\begin{array}{r} 2. \quad (2x + y = -15) \\ \quad -5x + y = 6 \\ \quad -2x - y = 15 \\ \hline \end{array}$$

$$-7x = 21$$

$$x = -3$$

$$y = -9$$

$$(-3, -9)$$

$$\begin{array}{r} 4. \quad 3x + 2y = 550 \\ \quad x = \frac{4}{5}y \end{array}$$

$$5 \left[3 \cdot \frac{4}{5}y + 2y = 550 \right]$$

$$12y + 10y = 2750$$

$$\begin{array}{r} 22y \\ (100, 125) \end{array}$$

$$y = 125$$

$$x = 100$$

$$\begin{array}{r} 6. \quad \left(\frac{r}{2} + \frac{s}{3} = 1 \right) \cdot \frac{1}{2} \\ \quad \frac{r}{4} + \frac{2s}{3} = -1 \end{array}$$

$$-\frac{r}{4} - \frac{s}{6} = \frac{1}{2}$$

$$6 \left[\frac{2s}{3} - \frac{s}{6} = -\frac{1}{2} \right]$$

$$4s - s = -9$$

$$3s = -9$$

$$r = 4 \quad s = -3$$

$$\frac{r}{2} + \frac{-3}{3} = 1$$

$$-1$$

$$\frac{r}{2} = 2$$

$$r = 4$$

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Practice with square roots and radicals.

Find the square root.

1. $\sqrt{121}$ (11)

2. $\sqrt{1600x^2}$ (40x)

3. $\sqrt{\frac{1}{289}}$ ($\frac{1}{17}$)

4. $\sqrt{13^2}$ (13)

Estimate the value of the square root. Do NOT use a calculator.

5. $\sqrt{15}$ 3.89

6. $\sqrt{59}$ 7.5

7. $\sqrt{149}$ 12.2

Simplify the following square roots.

8. $\sqrt{150y^7}$ $5y^3\sqrt{6y}$

9. $3\sqrt{20y^4z^5}$ $6y^2z^2\sqrt{5z}$

10. $6\sqrt{49a^6}$ $42a^3$

11. $5\sqrt{8x^9y^3}$ $10x^4y\sqrt{2xy}$

Multiply. Reduce all radicals.

12. $4\sqrt{8} \cdot 3\sqrt{10}$
 $8\sqrt{2}$
 $24\sqrt{20}$
 $48\sqrt{5}$

14. $3\sqrt{54} \cdot \sqrt{18}$
 $9\sqrt{6} \cdot 3\sqrt{2}$
 $27\sqrt{12}$
 $54\sqrt{3}$

15. $8\sqrt{6a^3} \cdot \sqrt{6a^3}$
 $8 \cdot 6 \cdot a^3$
 $48a^3$

16. $(2\sqrt{3} - 5\sqrt{7})^2$
 $(2\sqrt{3} - 5\sqrt{7})(2\sqrt{3} - 5\sqrt{7})$
 $12 - 10\sqrt{21} - 10\sqrt{21} + 175$
 $187 - 20\sqrt{21}$

Divide and simplify. Remember to rationalize the denominator.

17. $\sqrt{\frac{4}{5}}$ $\frac{2\sqrt{5}}{5}$

18. $2\sqrt{\frac{20}{3}}$ $2 \cdot \frac{4\sqrt{5}}{\sqrt{3}}$
 $\frac{4\sqrt{15}}{3}$

19. $\sqrt{\frac{30x^4}{28y}} \cdot \sqrt{\frac{15x^3}{14}}$
 $\frac{\sqrt{210x^7}}{14}$

20. $\sqrt{\frac{25y^6}{15x^3}}$ $\frac{5y^3}{3}$

Add and subtract. Simplify all radicals.

21. $\sqrt{18} - \sqrt{2} - \sqrt{8}$
 $3\sqrt{2} - \sqrt{2} - 2\sqrt{2}$
 0

22. $5\sqrt{48} - \sqrt{75} + 2\sqrt{12}$
 $20\sqrt{3} - 5\sqrt{3} + 4\sqrt{3}$
 $19\sqrt{3}$

23. $5\sqrt{3} + 2\sqrt{27} - \sqrt{72}$
 $5\sqrt{3} + 6\sqrt{3} - 6\sqrt{3}$
 $11\sqrt{3}$

Simplify.

24. $\frac{3}{5-2\sqrt{7}} \cdot \frac{5+2\sqrt{7}}{5+2\sqrt{7}}$
 $\frac{15+6\sqrt{7}}{25-28} = \frac{15+6\sqrt{7}}{-3}$
 $-5-2\sqrt{7}$

25. $\frac{4+2\sqrt{2}}{2\sqrt{5}-3} \cdot \frac{(2\sqrt{5}+3)}{(2\sqrt{5}+3)} = \frac{8\sqrt{5}+12+4\sqrt{10}+6\sqrt{2}}{20-9}$
 $\frac{12+8\sqrt{5}+4\sqrt{10}+6\sqrt{2}}{11}$

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Solving Quadratic Equations Review

Solve each equation by factoring.

1. $x^2 - 6x + 8 = 0$

$$(x-4)(x-2) = 0$$

$$\{4, 2\}$$

2. $y^2 - 3y = 40$

$$y^2 - 3y - 40 = 0$$

$$(y-8)(y+5) = 0$$

$$\{8, -5\}$$

3. $4x^2 + 17x + 15 = 0$

$$4x^2 + 5x + 12x + 15 = 0$$

$$x(4x+5) + 3(4x+5) = 0$$

$$(4x+5)(x+3) = 0$$

$$\left\{-\frac{5}{4}, -3\right\}$$

$$\begin{array}{r} 60 \\ 5 \times 12 \\ 17 \end{array}$$

4. $8y^3 + 2y^2 = 15y$

$$8y^3 + 2y^2 - 15y = 0$$

$$y(8y^2 + 2y - 15) = 0$$

$$y(8y^2 + 12y - 10y - 15) = 0$$

$$y(4y(2y+3) - 5(2y+3)) = 0$$

$$y(4y-5)(2y+3) = 0$$

$$\{0, \frac{5}{4}, -\frac{3}{2}\}$$

$$\begin{array}{r} 120 \\ 12 \times 10 \\ a \end{array}$$

5. $x^2 - 49 = 0$

$$(x+7)(x-7) = 0$$

$$x = \pm 7$$

$$\{\pm 7\}$$

6. $16x^2 + 24x + 9 = 0$

$$(4x+3)^2 = 0$$

$$x = -\frac{3}{4}$$

7. $4x^2 - 25 = 0$

$$(2x+5)(2x-5) = 0$$

$$x = -\frac{5}{2} \quad x = \frac{5}{2}$$

8. $x^4 - 2x^2 - 8 = 0$

$$(x^2-4)(x^2+2) = 0$$

$$x^2 = 4 \quad x^2 = -2$$

$$x = \pm 2 \quad x = \pm \sqrt{-2}$$

9. $6x^2 - 26x - 20 = 0$

$$6x^2 - 30x + 4x - 20 = 0$$

$$6x(x-5) + 4(x-5) = 0$$

$$(6x+4)(x-5) = 0$$

$$x = -\frac{4}{6} \quad x = 5$$

$$\left\{-\frac{2}{3}, 5\right\}$$

$$\begin{array}{r} -120 \\ -30 \times 4 \\ -26 \end{array}$$

Solve each equation using the quadratic formula.

10. $x^2 - 4x - 2 = 0$

$$4 \pm \sqrt{16 - 4(1)(-2)}$$

$$x = \frac{4 \pm 2\sqrt{6}}{2} = \{2 \pm \sqrt{6}\}$$

11. $3x^2 + 12x + 7 = 0$

$$-12 \pm \sqrt{144 - 4(3)(7)}$$

$$2(3)$$

$$x = \frac{-12 \pm 2\sqrt{15}}{6} = \frac{-6 \pm \sqrt{15}}{3}$$

12. $9c^2 + 12c - 1 = 0$

$$-12 \pm \sqrt{144 - 4(9)(-1)}$$

$$2(9)$$

$$c = \frac{-12 \pm 6\sqrt{5}}{18}$$

$$\frac{-2 \pm \sqrt{5}}{3}$$

13. $2x^2 - 3x - 2 = 0$

$$x = \frac{3 \pm \sqrt{9 - 4(2)(-2)}}{2(2)}$$

$$\frac{3 \pm 5}{4} = \left\{2, -\frac{1}{2}\right\}$$

14. $-4x^2 + 2x + 3 = 0$

$$-2 \pm \sqrt{4 - 4(-4)(3)}$$

$$2(-4)$$

$$x = \frac{-2 \pm \sqrt{52}}{-8} = \frac{-2 \pm 2\sqrt{13}}{-8} = \frac{+1 \pm \sqrt{13}}{4}$$